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MECHANICS.

208. Proposed by W. J. GREENSTREET, M. A., Marling School, Stroud, Eng.

Hanging at rest over a smooth pulley are two equal scale pans of the same mass. Two equal particles, the one inelastic and the other elastic, are simultaneously dropped from the same height one into each scale pan. Show that each impact after the first must occur when the pans have returned to the *status quo ante*, and find the total space described by either pan before motion ceases.

209. Proposed by W. J. GREENSTREET, M. A., Marling School, Stroud, Eng.

Two particles are projected along planes at angles α and $\frac{1}{2}\pi - \alpha$ to the horizon, the horizontal lines on the two planes being inclined at an angle ϕ . The initial relative velocity is parallel to a certain plane. Show the relative path is a parabola, and find the inclination of its axis to the vertical.

NUMBER THEORY AND DIOPHANTINE ANALYSIS.

149. Proposed by REV. R. D. CARMICHAEL, Anniston, Ala.

Prove that every prime of the form $4n+1$ may be expressed as the sum of two parts r and s such that $r^2 + rs + s^2 + 1$ is divisible by the prime.

150. Proposed by H. S. VANDIVER, Bala, Pa.

Show that for all positive integral values of n except unity, $(2n)!$ is less than $[n(n+1)]^n$. Direct proof preferred. [Unsolved problem in *Educational Times*.]

AVERAGE AND PROBABILITY.

192. Proposed by REV. R. D. CARMICHAEL, Anniston, Ala.

A point is taken at random in a square whose side is $2a$. With this point as center and radius= a a circumference is described. What is the mean area of that part of the circle which lies within the square?

BOOKS.

A Treatise on the Integral Calculus Founded on the Method of Rates. By William Woolsey Johnson, Professor of Mathematics at the United States Naval Academy, Annapolis, Md. Small 8vo. Cloth, xiv+440 pages, 71 figures. Price, \$3.00. New York: John Wiley and Sons.

This volume is an enlargement and an extension of the author's *Elementary Treatise on the Integral Calculus*, a revised edition of which appeared in 1898, and forms a companion volume to his *Treatise on the Differential Calculus*, published in 1904.